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ABSTRACT

A computer-based System of Interactive Guidance and Information (SIGI) was designed to enhance the student's freedom of choice, to develop his understanding of elements involved in choice, and to increase his competence in the process of making informed and rational career decisions. In the guidance system, the student interacts with a computer in such a way as to examine his own values, obtain and use relevant information, interpret predictive data, and formulate plans. This interaction helps the student to arrive at tentative career decisions and to modify the decisions as he gains new insights and additional information. The decisions involve both educational and occupational options, with emphasis on the process of decision-making. As the student gains control of the system, he progressively develops competencies and masters strategies for rational behavior in the face of uncertainty. (Author/SH)

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Chairman's Introduction to Program on SIGI, for APGA, San Diego

This program on "SIGI--a Computer-based System of Interactive Guidance & Information," is scheduled to run from 10:45 to 1:15. We should feel flattered that whoever assigned us this period had such confidence in our ability to compete with lunchtime hunger pangs. Perhaps the expectation was that we could count on the easterners to stay, since their biological clocks are still on God's time. But we want to be ecumenical and preach the gospel to westerners too. So we will compress our five initial presentations to no more than 20 minutes each.

I will start by summarizing the rationale for SIGI. Warren Chapman will describe the content with the aid of slide sequence that illustrates the track of a real student through SIGI, showing selected key frames that he saw on the CRT in the course of his interaction with SIGI last summer. Lila Norris will tell you about our field testing and evaluative research. Arthur Kroll will discuss issues involved in dissemination of a computer-based guidance system, along with our current plans for making SIGI available to users. John Krumboltz will share with you whatever speakable thoughts he has about SIGI. Then we'll all take a stretch and let those who are so inclined leave unobtrusively. Finally, we will give the survivors among you a chance to ask questions or make comments.

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Freedom and Wisdom in Career Decision-Making

Background

The main purpose of SIGI is to enhance the student's freedom of choice, to develop his understanding of elements involved in choice, and to increase his competence in the process of making informed and rational career decisions. The goal is to help the student become--in short--the conscious artist of his own career.

In this guidance system, the student interacts with a computer in such a way as to examine his own values, obtain and use relevant information, interpret predictive data, and formulate plans. This interaction helps the student arrive at tentative career decisions and in modifying them as he gains new insights and additional information. The decisions involve both educational and occupational options. Emphasis, however, is not merely on the content of decisions but on the process of decision-making. As the student progresses through SIGI, he learns to move freely within the structure of the system. In gaining control of the system, he progressively develops competencies and masters strategies for rational behavior in the face of uncertainty.

Although the current version is designed specifically for use at community and junior colleges, it can be readily adapted for other populations and settings.

SIGI got under way as a formal project in 1968, with a grant from the Carnegie Corporation. By then, I had been writing and speaking about the model of guidance on which it is based for about 15 years, although not until a decade ago did I note that the power of

this model could be greatly amplified by use of a computer. This notion was realized when Bill Godwin took major responsibility for hardware selection and programming.

By 1970 we had a prototype of SIGI running and demonstrated it at a conference on vocational guidance systems at ETS. This demo ran beautifully and was very favorably received, but for various practical reasons we decided to change to different hardware and so were stuck with the labor of rewriting and reprogramming all of our material. Enough of this work was completed on the new computer and terminal to run a preliminary tryout last summer at our own laboratory, with 30 students who were about to enter MCCC. As we meet today, a "real" field test, partially supported by a grant from the NSF, is about to start at the MCCC campus.

To put the rationale for SIGI in the broad perspective of the social and behavioral sciences, I will leap lightly over a vast terrain, touching on just a few of the high spots from which these sciences have observed, tried to understand, explain, and in some cases influence human behavior.

(1) The biologist and ethologist look at human beings in relation to other species. They note similarities that link human beings to other forms of life and differences that demarcate them. Behavior is "explained" as largely instinctual, and the primary determinant of change in behavior is evolution.

(2) The geneticist seeks to explain similarities and differences between people as a function of their genes. He focuses on behavior that stems from inherited characteristics. Changes in behavior can be effected through breeding, perhaps eventually through genetic engineering.

(3) The anthropologist and sociologist look to culture to account for similarities and differences between groups or sub-groups of people. Behavior depends largely on roles in the culture, and is shaped by acculturation.

(4) Many psychologists focus more specifically on the reinforcements experienced by each person in his environment. Behavior is modified by controlling the contingencies of reinforcement. (The attitude that true believers among the "behaviorists" exhibit toward reinforcement may be compared with the hubris of Archimedes exclaiming about the lever, "Give me a place to stand and I can raise the world.")

(5) Another ideology emphasizes the autonomy of each person, his free will, his capability of making purposive, intentional decisions about his own behavior. Subscribers to this school of thought (some of whom call themselves ego psychologists) believe that a person can change his own behavior by understanding himself better, by taking thought about himself and the options open to him, getting and interpreting appropriate information, and then taking action to achieve the goals he has chosen.

SIGI fits into this last slot--as does, indeed, the theme of this convention, "Proactivity." Back in the early 50's, I coined the word "proception" to stand for the person's visualizing himself in the future. But first, of course, he must perceive himself in his present state before he can "proceive" the new state to which he aspires and make plans and take actions to get there.

As even this hasty and oversimplified outline must make clear, these various approaches to human behavior are not mutually exclusive. Perhaps, though, in the tradition of the fascinating aphorism, "Ontogeny recapitulates phylogeny," we may discern a maturational trend in the extent to which the various forces implied by these approaches govern behavior at successive stages of a person's development. At the earliest stage, the infant's behavior seems dominated by instinctual drives, with the behavior of one individual relatively less differentiated from that of another. Then, hereditary differences become more evident, and behavior more clearly differentiated. Increasing socialization of the child gives the culture more opportunity to affect his behavior.

Meanwhile, a number of persons (such as parents, teachers, peers) have been exercising the power to reinforce selected behaviors. But at some point, usually in adolescence, most people in our culture emerge into a stage in which autonomy becomes the name of the game. As a person progresses through these stages, at any point, his behavior seems capable within whatever constraints are allowed by being a member of the human species, having inherited a given set of genes, being brought up in a certain culture, and subjected to selected arrays of reinforcements, most young men and women seem to want to become as independent as possible. They seem to want to use as much space as is left them for making their own decisions, for determining their own behavior--even those who decide to become behaviorists. We have not yet progressed, if that is the word, entirely "beyond freedom and dignity."

of variation up to the limits established by preceding stages. Thus,

It is to this striving for freedom in decision-making that SIGI addresses itself, specifically in the area of career decision-making. But, just as the "right to read" involves competence as well as freedom, we believe that we can enhance the freedom of the decision-maker by helping him to grow in the wisdom of decision-making.

Now, what is wisdom?

We have progressed a bit, of course, from the heyday of trait-and-factor theory when counselors knew what a wise decision was, and the student's agreement with the expert represented wisdom. Many a counselor in the late 50's or early 60's heeded the goal, supported by an Act of Congress (NDEA), to identify able students and encourage them to prepare for certain high-level occupations. Of course, NDEA owed its existence partly to the shock of sputnik--so

such a counselor might feel particularly effective if, with his guidance, one of his brightest and ablest students decided to become an aerospace engineer. But now that former student is unemployed. Was his decision a wise one? Was his guidance good?

To define wise decisions in terms of outcomes is not only difficult; it is presumptuous. Tennyson wrote, "No man can be more wise than destiny." A more productive approach, it seems to me, is to shift the emphasis from outcome to process. So I define wisdom in decision-making as learning to make decisions wisely. "Wise decisions" implies an understanding of outcomes and a mastery over events to which we cannot aspire. "Making decisions wisely," on the other hand, implies an understanding of self and a mastery over processes which may be more attainable. It is in this sense of wisdom that Tennyson is contradicted by the old Latin motto ("Fato prudentia major"), "Wisdom is stronger than fate."

The problem in identifying wise decisions is not just the time-lag between the choice-point and the judgment day--the day when all the evidence on consequences of the choice is in. Valid predictions and probability statements can help us bring the future into the psychological present. Nor is the problem just a matter of insufficient predictive validity. Predictive data are really historical data, and our predictions are manifestations of what we have learned from history. So if our predictors had perfect validity, we could extend the aphorism "Those who do not learn from history are condemned to repeat it," by adding, "And those who do learn from history are also condemned to repeat it." But in fact we don't repeat

history, even when events materialize as we have predicted. For there is always a surplus of events--there are more events than predictions. Any decision that is not trivial has ramifications without end.

Consider, as a somewhat painful example, the decision of the United States government to support Diem in South Vietnam. Not all the outcomes of that decision were predicted, and no granaries were built for storing the surplus events until such time as we need them--or at least are better able to cope with them.

As the Pentagon papers have made clear, the fault in the decision to intervene in Vietnam was in the process, not just in the outcome. Suppose the outcome had been somewhat different: suppose we had had a quick military success there--had "brought the coonskin home and nailed it to the wall." Would that military success have wiped the slate clean of the flaws in decision-making? Would it have justified our decision? Perhaps it would have prevented the moral questions from being raised--as when we intervened in the Dominican Republic--although it is unlikely that we could have "won" in Vietnam that fast, or with less publicity and condemnation than the Russian interventions in Hungary and Czechoslovakia. At least a few voices would have cried out in the wilderness about the moral issues. But a victorious outcome would have prevented widespread popular concern. My Lai and tiger cages and one-man election races and hospital bombings would never have plagued us, and the whole incident would have soon blown over in the media and the public consciousness. Would that military success have made the decision a wise one? Would the decision have been made any more wisely?

For the sake of argument, let us even suppose that we had predicted and could evaluate the ramified outcomes of this decision as in some sense superior to those which would have been produced by any alternative decision. Even then, what would the substantive payoff of this decision reinforce? The content of this decision itself? But this same decision is not likely to come up again. We only pass this way once. Then we would be hard put to claim an increment in wisdom from the content of this decision. The content of a single wise decision is not likely to be transferable to the next decision, and the next. Fifty chimpanzees typing for fifty years might compose the complete works of Shakespeare, but they wouldn't know how to write a new work of similar quality. In terms of content and outcomes, they might have made "wise" decisions, and yet they would be none the wiser.

In fact, what one learns from the multitude of real-life outcomes may or may not be relevant to wisdom. Like Mark Twain's cat, who learned from sitting on a hot stove never to sit on any stove again, we may learn from these outcomes more "wisdom" than is in them. For example, the current flow of outcomes from the Viet Nam decision might teach us to revert to isolationism (in contradiction to the "lessons" from previous decisions and outcomes). The little boy who is spanked for turning the faucets on full blast and flooding the bathroom may learn not to wash his hands and face.

It is these tendencies to "generalize" that lead the behaviorists to concern themselves with contingencies of reinforcement. Or as O. H. Mowrer once put it, "You've got to be smarter

than the rat." Well said, since such an approach to defining wisdom in terms of outcomes requires that wisdom reside in the experimenter (or counselor) not in the subject (or student). But this is where the presumption comes in: Do we as counselors know which decisions are wise?

Here one may object, are there not "universally desired" outcomes that represent a cultural consensus or folk wisdom for which the counselor may serve as spokesman? Let us grant that we can teach students to make some decisions that lead--with a high degree of probability and with low risk--to universally desired outcomes.

But when we have identified such universals and induced students to learn them, we are not really concerned with decision-making or with guidance. Then we are concerned with indoctrination. A large part of an individual's schooling consists of such indoctrination. The distinctive concern of guidance, however, is not with the universals, but with the "alternatives"--toward which the culture tends to be more permissive.

Indeed, our greatest folk-wisdom, our most compelling "universal," may apply most directly to the process of constructing and choosing alternatives. For may we not regard democracy itself as an evolving process of decision-making? It is its processes, not the content of any one policy decision, that make democracy distinctive.

On every issue in our pluralistic society competing interests and pressure groups are heard. How do these differences get resolved "wisely"? The necessary condition, we believe, is freedom--the open marketplace of ideas, in which every voice can be heard and judged.

Out of this confrontation of competing values, the legislative or executive can find--or claim to find--a consensus for decision, to be translated into a mandate for action. But it does not stop here. The process is ongoing, permitting revision of content in accordance not just with outcomes, but also with changes in values and objectives. This provision for change, this ability to accommodate to new situations and circumstances, has perhaps insured the survival of democracy, up till now, through so many vicissitudes. (The ability to reverse the decision on Vietnam would be a sign of strength, not weakness.)

Need I belabor the analogy with individual decision-making? The individual too recognizes that he must choose between competing values. How then does he make order out of the rabble of impulses that beset him? By neither suppressing nor blindly obeying them, but by bringing them under the rule of reason, giving each "equal time" and attention. The individual, like the nation, must hold himself open and receptive to different values, allowing each to speak to him as loudly as the others. So the first step in the process involves active and systematic examination and exploration of competing values.

One way in which he can examine values is to study their sources. Here we see a nice articulation of education and guidance. If a major purpose of education is to transmit the culture, an important purpose of guidance is to help the individual come to terms with the culture--that is, the choices he makes will indicate how he sees himself in the culture. But first he must see the culture

in himself. So his first question must be, where have my values come from? Then he will be better prepared to ask, where are they taking me?

When the student has taken full cognizance of the range of values in the culture, and has formulated his own value system seeing their sources in instincts, in heredity, in culture, in previous conditi quite explicitly, he will be ready to lay his values on the line of reinforce- ments, in making a decision. The specifics of a strategy for accomplishing this will be described by the next speaker. But I want to emphasize that with the individual, as with the nation, decision-making should be an ongoing process, subject to continual revision. Otherwise, he may run afoul of the warning that "the only thing worse than not getting what you want is getting it."

In shunning a definition of wise decisions in terms of content, or predicted outcome, I have assumed that experience does not teach us what will be best for the individual (or society) except freedom to work things out. Thus, I have defined the best choice as the choice that is most nearly free. But freedom does not mean <u>laisser-faire</u>. Rather, I speak of the freedom that comes from competence in decision-making. Without directing the <u>content</u> of an individual's choice, we do think we can help him in the <u>process</u> of choosing. This emphasis on process does not pretend to insure the "right" choice--except insofar as the right choice is defined as an informed and rational choice. Our bias--our conviction--is that in education enlightened processes are intrinsically important. Therefore, we bend our efforts to increase the student's understanding of the factors

involved in choice (imperfect though our own understanding may be) so that he can take responsibility for his own decision-making, examine himself and explore his options in a systematic and comprehensive way, take purposeful action in testing hypotheses about himself in various situations, and exercise flexibility in devising alternate plans.

In short, we don't want to play the decision-making game for him. We want to help him master the strategies for rational behavior in the face of uncertainty (which may be the nearest he can get to wisdom) so that he can play the game effectively himself.

Horace, in one of his satires, asked "Who then is free?" and answered "The wise man who can govern himself."

Let us make "free" with Horace, and interchange the descriptors, to ask, "Who then is wise?" and answer "The man who can govern himself freely."

How does SIGI do all this? As you listen to the next speaker, bear in mind that SIGI tries to help students move toward this ideal of rational and informed decision-making. It tries to give them a vision and a sense of what the ideal is. It also tries to help them take practical steps toward mastery of the process. It does not instantly convert them into compleat rational and informed decision-makers. Furthermore, all the data in SIGI are not perfect. Some are firmer than others. But as Kenneth Boulding has said, it is better to have imperfectly accurate measures of as many relevant variables as possible than to consider only those few variables that can be measured with a high degree of accuracy.

Introductions of Speakers

Warren Chapman--a former college English instructor, writer, close student of CAI and CMI, and a flow-chartist par excellence--who has made very considerable contributions to the SIGI scripts since joining us two years ago, will describe for you the content of SIGI.

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Lila Norris, who has collaborated with me on a large-scale study of academic interests and other projects, has been a member of the SIGI staff since its beginning. Her major responsibilities have included the prediction system and the evaluation studies. She will give you a sample of our findings from the preliminary tryout last summer and describe the design and method of the field test that is now beginning.

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Arthur Kroll, formerly of Harvard and Clark Universities and more recently President of Interactive Learning Systems, joined the Programs Division of ETS last year as Director of Guidance Services. His primary responsibility is the dissemination and use of SIGI as it makes the transition from an r and d project to an operating program. He will tell you about his study of some of the options and his decision-making processes as he tries to make informed and rational plans (proception and proactivity).

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John Krumboltz, spending this year at ETS on leave from his professorship at Stanford University, is well known to all of you. As a

member of the SIGI Advisory Committee, which includes also Henry Borow, Charles Collins, Joe Fordyce, Dick Greenfield, and--as chairwoman--Jane Matson, John has had a special vantage point from which to view SIGI. He has sat in on enough of our discussions and show-and-tell to know where the bodies are buried. I look forward with considerable interest to hear what he is going to say about us.